

Applicants respectfully traverse Examiner's rejection because Meyers et al does not disclose each and every element of the invention as claimed in claim 18. Examiner states in pertinent art that:

[...]Meyers teaches an integrated optical apparatus (Figure 6) comprising [...] the cavity positioned with respect to the gratings such that light scattered outside the portion of the optical path is reflected by the cavity towards the gratings (column 5, lines 40-52)[...]

Examiner points out to Meyers figure 6 and an air filled slot described in column 5 lines 40-52 as being a structure falling under the language of claim 18. Applicants respectfully submits that Meyers teaches an air filled slot, placed in the path of a waveguide, acts as a mirror to make bends and helps to reduce the overall circuit size. This air filled slot is referred to as an internal turning mirror in column 5 lines 40-52 which bends the light **along the path of the waveguide** and can not be considered equivalent to the cavity within the meaning of claim 18. The cavity as cited in claim 18 is positioned such that light is **reflected toward the gratings** which in turn bends the light along the path of the waveguide. The air filled slot in Meyers **bends the light along the path of the waveguide** directly whereas the gas-filled cavity cited in claim 18 does not bend the light along the path of the waveguide but merely reflect light toward the gratings which in **an orthogonal direction to the path of the waveguide**. Accordingly Meyers does not disclose the gas-filled cavity reflecting light towards the gratings in claim 18.

Regarding claim 19-20 and 24:

Claim 19-20 and 24 depend from claim 18, and are therefore not anticipated by Meyers et al for the same reasons as claim 18.

Accordingly, Applicants submit that the invention as claimed in claims 18-20 and 24 are not anticipated by Meyers et al under 35 U.S.C. §102(b) and respectfully request the withdrawal of the rejection of the claims.

Claims 28-36

Claim 28 is rejected under 35 USC 102(b) as being anticipated by US Patent to Friessem et al, number 6,215,928.

Regarding claim 28:

Applicants respectfully traverse Examiner's rejection because Meyers et al does not disclose each and every element of the invention as claimed in claim 28. Examiner states in pertinent art that:

[...]Friessem teaches an integrated optical apparatus (Figure 2) comprising: a planar waveguide (22) having an elongated guiding portion and a grating coupler (24) [...]

Examiner points out to Friessem figure 2 as being a structure falling under the language of claim 28. Applicants respectfully submit that Friessem does not teach an elongated guiding portion of a planar waveguide as cited in claim 28. This elongated guiding portion is illustrated in applicants' application figures 2, 3, 5, 7, and 11-14.

Regarding claims 29-36:

Claims 29-36 depend from claim 28, and are therefore not anticipated by Meyers et al for the same reasons as claim 28.

Accordingly, Applicants submit that the invention as claimed in claims 28-36 is not anticipated by Meyers et al under 35 U.S.C. § 102(b) and respectfully request the withdrawal of the rejection of the claims.

Claims 37 and 45

Claims 37 and 45 are rejected under 35 USC 102(b) as being anticipated by US Patent to Welch et al, number 37,354.

Regarding claim 37:

Claim 37 has been amended to include additional limitations “(ii) wherein said elongate scattering elements have respective scatter cross-sections adapted to scatter light along at least a portion of a predetermined optical path for matching optical mode of plane waves in said elongate guiding portion and said optical element and (iii) said planar waveguide is fabricated in silicon.” Support for this amendment is found in page 17 line 25 – page 18 line 6 and page 19 lines 3-4.

Applicants respectfully traverse Examiner’s rejection because Welch et al does not disclose each and every element of the invention as claimed in claim 37 as amended. Examiner states in pertinent art that:

[...]Welch teaches an integrated optical apparatus (Figure 9) comprising: a planar waveguide (112) having an elongated guiding portion and a grating coupler (119) [...]

Examiner points out to Welch figure 9 as being a structure falling under the language of claim 37. Applicants respectfully submit that Welch teaches an amplifier chip for providing laser out put (column 9 lines 46-48) using heterostructure material composition such as various III-V compounds(column 9 lines 22-24). The structure in Welch figure 9 is a gain medium

with the purpose of generating and amplifying light and it also forms a laser cavity and can not be considered equivalent to the silicon planar waveguide within the meaning of claim 37. The silicon planar waveguide as cited in claim 37 comprises elongate scattering elements have respective scatter cross-sections adapted to scatter light along at least a portion of a predetermined optical path for matching optical mode of plane waves in said elongate guiding portion and said optical element. This is illustrated in applicants' application figures 3 and 4 where the plurality of gratings of varying widths or dimensions matches optical modes of light in the optical fiber 106 and guiding portion 104. The laser taught by Welch does not couple light into the laser and Welch does not disclose a plurality of gratings of varying widths or dimensions for matching optical modes of light in the optical fiber and guiding portion in his figure 9. Accordingly Welch does not disclose silicon planar waveguide and does not disclose elongate scattering elements have respective scatter cross-sections adapted to scatter light along at least a portion of a predetermined optical path for matching optical mode of plane waves in said elongate guiding portion and said optical element in claim 37.

Regarding claim 45:

Claim 45 depend from claim 37, and is therefore not anticipated by Welch et al for the same reasons as claim 37.

Accordingly, Applicants submit that the invention as claimed in claims 37 and 45 is not anticipated by Welch et al under 35 U.S.C. §102(b) and respectfully request the withdrawal of the rejection of the claims.

Claim Rejections – 35 USC §103

Claims 21-23

Claims 21-23 are rejected under 35 USC 103(a) as being unpatentable over Meyers in view of US Pre Grant Publication to Haronian, number 2003/0108274. Applicants respectfully traverse the rejection because the combination does not teach each and every element of the invention as claimed in claims 21-23.

Meyers teaches the limitations of the base claim 18.

Haronian teaches a waveguide on a substrate comprises a silicon wafer.

Claims 21-23 depend from claim 18, which recites gas-filled cavity reflecting light towards the gratings. As explained above regarding the anticipation rejection, Meyers fails to disclose the gas-filled cavity within the meaning of claim 18. The waveguide of Haronian does not cure this deficiency. As neither Meyers nor Haronian teaches gas-filled cavity reflecting light towards the gratings as claimed in claim 18, the combination cannot be interpreted to disclose the claimed element. The gas-filled cavity according to Applicants' invention reflects light scattered outside a predetermined optical path towards the gratings which in turn bend light along the path of the waveguide. Such gas-filled cavity structure is distinct from the air filled slot which bends the light **along the path of the waveguide directly** as in Meyers, even if combined with the waveguide of Haronian. Because the combination of references misses elements that provide capabilities not suggested by the prior art, the combination does not render the claimed invention obvious under 35 U.S.C. §103.

Therefore, the combination cannot render obvious Applicants invention as claimed in claims 21-23, and Applicants respectfully request withdrawal of the rejection of the claims under 35 U.S.C. §103(a) over the combination.

Claim 25

Claim 25 is rejected under 35 USC 103(a) as being unpatentable over Meyers in view of US Patent to Borak et al, number 6,003,340. Applicants respectfully traverse the rejection because the combination does not teach each and every element of the invention as claimed in claim 25.

Meyers teaches the limitations of the base claim 18.

Borak teaches a waveguide with a cladding.

Claim 25 depends from claim 18, which recites gas-filled cavity reflecting light towards the gratings. As explained above regarding the anticipation rejection, Meyers fails to disclose the gas-filled cavity within the meaning of claim 18. The waveguide of Borak does not cure this deficiency. As neither Meyers nor Borak teaches gas-filled cavity reflecting light towards the gratings as claimed in claim 18, the combination cannot be interpreted to disclose the claimed element. The gas-filled cavity according to Applicants' invention reflects light scattered outside a predetermined optical path towards the gratings which in turn bend light along the path of the waveguide. Such gas-filled cavity structure is distinct from the air filled slot which bends the light **along the path of the waveguide directly** as in Meyers, even if combined with the waveguide of Borak. Because the combination of references misses elements that provide capabilities not suggested by the prior art, the combination does not render the claimed invention obvious under 35 U.S.C. §103.

Therefore, the combination cannot render obvious Applicants invention as claimed in claim 25, and Applicants respectfully request withdrawal of the rejection of the claims under 35 U.S.C. §103(a) over the combination.

Claims 29-36

Claims 29-36 are rejected under 35 USC 103(a) as being unpatentable over Friessem in view of US Patent to Snavelly et al, number 4,173,778. Applicants respectfully traverse the rejection because the combination does not teach each and every element of the invention as claimed in claims 29-36.

Friessem teaches the limitations of the base claim 28.

Snavelly teaches an anti-reflection coating.

Claims 29-36 depend from claim 28, which recites an elongated guiding portion of a planar waveguide. As explained above regarding the anticipation rejection, Friessem fails to disclose the elongated guiding portion of a planar waveguide within the meaning of claim 28. The anti-reflection coating of Snavelly does not cure this deficiency. As neither Friessem nor Snavelly teaches the elongated guiding portion of a planar waveguide as claimed in claim 28, the combination cannot be interpreted to disclose the claimed element. The elongated guiding portion of a planar waveguide according to Applicants' invention enables optical mode matching in conjunction with a flared waveguide portion (page 17 line 25 - page 18 line 6) and is not possible with the waveguide as in Friessem, even if combined with the anti-reflection coating of Snavelly. Because the combination of references misses elements that provide capabilities not suggested by the prior art, the combination does not render the claimed invention obvious under 35 U.S.C. §103.

Therefore, the combination cannot render obvious Applicants invention as claimed in claims 29-36, and Applicants respectfully request withdrawal of the rejection of the claims under 35 U.S.C. §103(a) over the combination.

Claims 41-43

Claims 41-43 are rejected under 35 USC 103(a) as being unpatentable over Welch in view of Meyers. Applicants respectfully traverse the rejection because the combination does not teach each and every element of the invention as claimed in claims 41-43.

Welch teaches the limitations of the base claim 37.

Meyers teaches an integrated optical apparatus comprising an air filled slot.

Claims 41-43 depend from claim 37 and an additional limitation from claim 18 which recites a gas-filled cavity such that light scattered outside a predetermined optical path is reflected by said cavity towards a plurality of gratings. As explained above regarding the anticipation rejection of claim 18, Meyers fails to disclose the gas-filled cavity within the meaning of claim 18 and 41. The teaching of Welch does not cure this deficiency. As neither Meyers nor Welch teaches gas-filled cavity reflecting light towards the gratings as claimed in claim 18 and 41, the combination cannot be interpreted to disclose the claimed element. The gas-filled cavity according to Applicants' invention reflects light scattered outside a predetermined optical path towards the gratings which in turn bend light along the path of the waveguide. Such gas-filled cavity structure is distinct from the air filled slot which bends the light **along the path of the waveguide directly** as in Meyers, even if combined with the teaching of Welch. Because the combination of references misses elements that provide capabilities not suggested by the prior art, the combination does not render the claimed invention obvious under 35 U.S.C. §103.

Therefore, the combination cannot render obvious Applicants invention as claimed in claims 41-43, and Applicants respectfully request withdrawal of the rejection of the claims under 35 U.S.C. §103(a) over the combination.

Claims 44

Claim 44 is rejected under 35 USC 103(a) as being unpatentable over Welch in view of Meyers as applied to claim 43 above, and further in view of Borak. Applicants respectfully traverse the rejection because the combination does not teach each and every element of the invention as claimed in claim 44.

Welch teaches the limitations of the base claim 37.

Meyers teaches an integrated optical apparatus comprising an air filled slot.

Borak teaches a waveguide with a cladding.

Claims 44 depend from claim 41 which recites a gas-filled cavity such that light scattered outside a predetermined optical path is reflected by said cavity towards a plurality of gratings. As explained above regarding the rejection of claims 41-43, the combination of Meyers and Welch fail to disclose the gas-filled cavity within the meaning of claim 41. The teaching of Borak does not cure this deficiency. As neither Meyers/Welch nor Borak teaches gas-filled cavity reflecting light towards the gratings as claimed in claim 41, the combination cannot be interpreted to disclose the claimed element. The gas-filled cavity according to Applicants' invention reflects light scattered outside a predetermined optical path towards the gratings which in turn bend light along the path of the waveguide. Such gas-filled cavity structure is distinct from the air filled slot which bends the light **along the path of the waveguide directly** as in Meyers, even if combined with the teaching of Welch and Borak.

Because the combination of references misses elements that provide capabilities not suggested by the prior art, the combination does not render the claimed invention obvious under 35 U.S.C. §103.

Therefore, the combination cannot render obvious Applicants invention as claimed in claim 44, and Applicants respectfully request withdrawal of the rejection of the claims under 35 U.S.C. §103(a) over the combination.

Claims 46-50

Claims 46-50 are rejected under 35 USC 103(a) as being unpatentable over Welch in view of Snavelly. Applicants respectfully traverse the rejection because the combination does not teach each and every element of the invention as claimed in claims 46-50.

Welch teaches the limitations of the base claims 37 and 45.

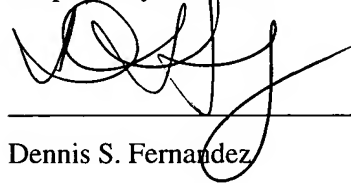
Snavelly teaches an anti-reflection coating.

Conclusion

In view of the foregoing, Applicants believe that all of the claims 18-25, 28-36, claim 37 as amended and claims 41-50 are now in condition for allowance and respectfully request the Examiner to issue a timely Notice of Allowance. If for any reason, the Examiner believes any of the claims are not in condition for allowance, he is encouraged to phone the undersigned at (650) 325-4999 so that any remaining issues may be resolved.

The above changes are believed not to add new matter, as support is found in the specification.

Respectfully submitted,



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